WIND RIVER IRRIGATION PROJECT, RAY LAKE DAM OUTLET WORKS
(Little Wind River Unit)
Wind River Indian Reservation
Fort Washakie vicinity
Fremont County
Wyoming

HAER WY-95-E
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
INTERMOUNTAIN REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
12795 West Alameda Parkway
Denver, CO 80228

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HAER No. WY-95-E

I. INTRODUCTION

Location:	The Ray Lake Dam Outlet Works lies within Ray Lake Dam and is approximately four miles southeast of the town of Fort Washakie, Wyoming. The structure is located within the Little Wind River Unit, Wind River Irrigation Project, Wind River Indian Reservation, Fremont County, Wyoming.
Quad:	Ray Lake, Wyoming
UTM:	Zone: 13; Easting 677996; Northing 4748004
Date of Construction:	1924
Present Owners:	United States Government
Present Use:	The Ray Lake Dam Outlet Works controls the release of water from the Ray Lake Reservoir for use within the Wind River Irrigation Project.
Significance:	In the early years of the Wind River Irrigation Project, increased cultivation combined with several years of severe drought necessitated a supplemental water source. Competed in 1925, the Ray Lake Dam created the first storage reservoir constructed within the Wind River Irrigation Project. Since its construction, the Ray Lake Dam Outlet Works has controlled the release of supplemental water for the Little Wind River Unit, Wind River Irrigation Project on the Wind River Indian Reservation in Wyoming.
Historian:	Joan L. Brownell Billings, MT November 2009

II. HISTORY

In the 1880s, farmers and ranchers, who settled illegally on lands south of Fort Washakie, Wyoming within the Wind River Indian Reservation, reportedly diverted water for irrigation ditches from a natural depression that became known as Ray Lake.[1]

In 1894, the U.S. Government granted the first authorized expenditure for irrigation construction on the Wind River Indian Reservation. This expenditure resulted in the construction of the Ray Canal (today a component of the Little Wind River Unit). By 1895, the Ray Canal extended for 10 miles. After 1895, several other efforts to construct irrigation ditches on the reservation were attempted but never completed. The Act of March 3, 1905, known as the McLaughlin Treaty, provided initial funding for the Wind River Irrigation Project.[2]

In the early years of the Wind River Irrigation Project, Ray Lake, named for Indian Agent Patrick H. Ray, was recognized for its potential as a reservoir. Surveys were conducted to determine its feasibility and sometime between 1910 and 1913, it appears a low dike (8′-0″ to 10′-0″) was constructed to store water. This is further supported by a 1912 Indian Irrigation Service map and a 1915 General Land Office map that identify Ray Lake Reservoir at this location.[3]

During the latter half of the 1910s, Wilbur S. Hanna, Chief Inspector of the Indian Irrigation Service, repeatedly expressed concern over water shortages due to increased cultivation and drought conditions. In 1919, Hanna reported on water deficiencies particularly in the Ray Canal system and recommended Ray Lake as one of two possible storage sites which could be developed at a small expense on the Wind River Irrigation.[4]

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[1] Indian Agent Captain Patrick Ray removed these settlers from the reservation. Todd Guenther, *Results of Historical Research on the Washakie Dam, South Fork of the Little Wind River Near Fort Washakie, Wyoming*, prepared for Charles A. Reher, Department of Anthropology, University of Wyoming, Laramie, WY, 19-20, as referenced in Blain Fandrich, *The Wind River Irrigation Project: A Class I Overview of Irrigation on the Wind River Reservation, Fremont County, Wyoming*, prepared for Cooper Zietz Engineers by Ethnoscience, Inc., Billings, MT, 2007, 9.

[2] Fandrich, *Wind River Irrigation Project*, 8-9, 10-11.

[3] Wilbur S. Hanna, *Project History, Wind River Irrigation Project, Wyoming, 1916*, Vol. 1, U.S. Indian Irrigation Service, on file, Rocky Mountain Region Library, Bureau of Indian Affairs, Billings, MT, 8-9; U.S. Department of the Interior, Bureau of Reclamation, *Ray Lake Dam Comprehensive Dam Review,* on file, Rocky Mountain Region, Bureau of Indian Affairs, Billings, MT, May 2006, 8; U.S. Surveyor General, "General Land Office 1915 survey map T1S R1W," accessed at www.glorecords.gov on November 16, 2009.

[4] Wilbur S. Hanna, *Annual Report 1917, District No. 3,* U.S. Indian Irrigation Service, on file, Rocky Mountain Region Library, Bureau of Indian Affairs, Billings, MT, 49; Hanna, *Annual Report 1918*, 40; Hanna, *Annual Report 1919*, 35-36.

By the summer of 1920, the U.S. Indian Irrigation Service completed plans for the Ray Lake Dam and began construction of a "temporary waste ditch to drain Ray Lake."[5] In the next few years, lack of funding delayed further construction except for a temporary gate at the Ray Lake outlet constructed in 1921. In 1923, about sixteen inches of water drawn from Ray Lake compensated for water shortages at several ditches.[6]

In 1924, Hanna reported that the "principal item of cost was the construction of the reinforced concrete outlet structure for the Ray Lake Storage Reservoir."[7] The completion of the dam in 1925 resulted with Ray Lake Reservoir having a capacity of 7,000 square feet. Today Ray Lake Reservoir has the capacity of 8,100 acre-feet. Ray Lake Reservoir stores flood waters from the South Fork of the Little Wind River and provides supplemental water to the Sub-Agency Canal and portions of the Coolidge Canal within the Little Wind River Unit, Wind River Irrigation Project.

III. ARCHITECTURAL DESCRIPTION

Ray Lake Dam is an earthen embankment dam located about four miles southeast of the town of Fort Washakie within the Wind River Indian Reservation (Figure 1). The Ray Lake Dam outlet works is situated at the maximum section of the main dam embankment and consists of a concrete intake structure, a concrete upstream conduit, a concrete wet-well gate chamber with manual slide gate, a concrete conduit downstream from the gate chamber and a concrete outlet structure called a stilling basin. Figure 2 shows the original 1920 drawings for the Ray Lake Dam Outlet Works.[8]

The intake structure is a 21′-0″ long trapezoidal channel with warped 8″ thick side walls. The upstream conduit is 47′-0″ long, 4′-0″ high and 4′-0″ wide. The downstream conduit is 44′-0″ long and is also 4′-0″ square. The wet-well chamber sits between the conduits and is 5′-0″ long. This chamber holds a single 4′-0″ wide by 4.5′-0″ high caste-iron gate slide mounted on a

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[5] Hanna, *Annual Report 1920*, 56-57.

[6] Ibid; Hanna, *Annual Report 1921*, 88, 91; Hanna, *Annual Report 1922*, 79; Hanna, *Annual Report 1923*, 161.

[7] Hanna, *Annual Report 1924*, 116.

[8] The outlet works intake structure and conduits were submerged and therefore could not be photographed. This description is taken primarily from U.S. Department of the Interior, Bureau of Reclamation, *Ray Lake Dam Intermediate Examination Report Wind River Indian Reservation*, prepared for U.S. Department of the Interior, Bureau of Indian Affairs, Safety of Dams Program, December 2008, 1-2. Doug Oellermann, Rocky Mountain Region, Bureau of Indian Affairs, Billings, MT assisted with the description of the stilling basin.

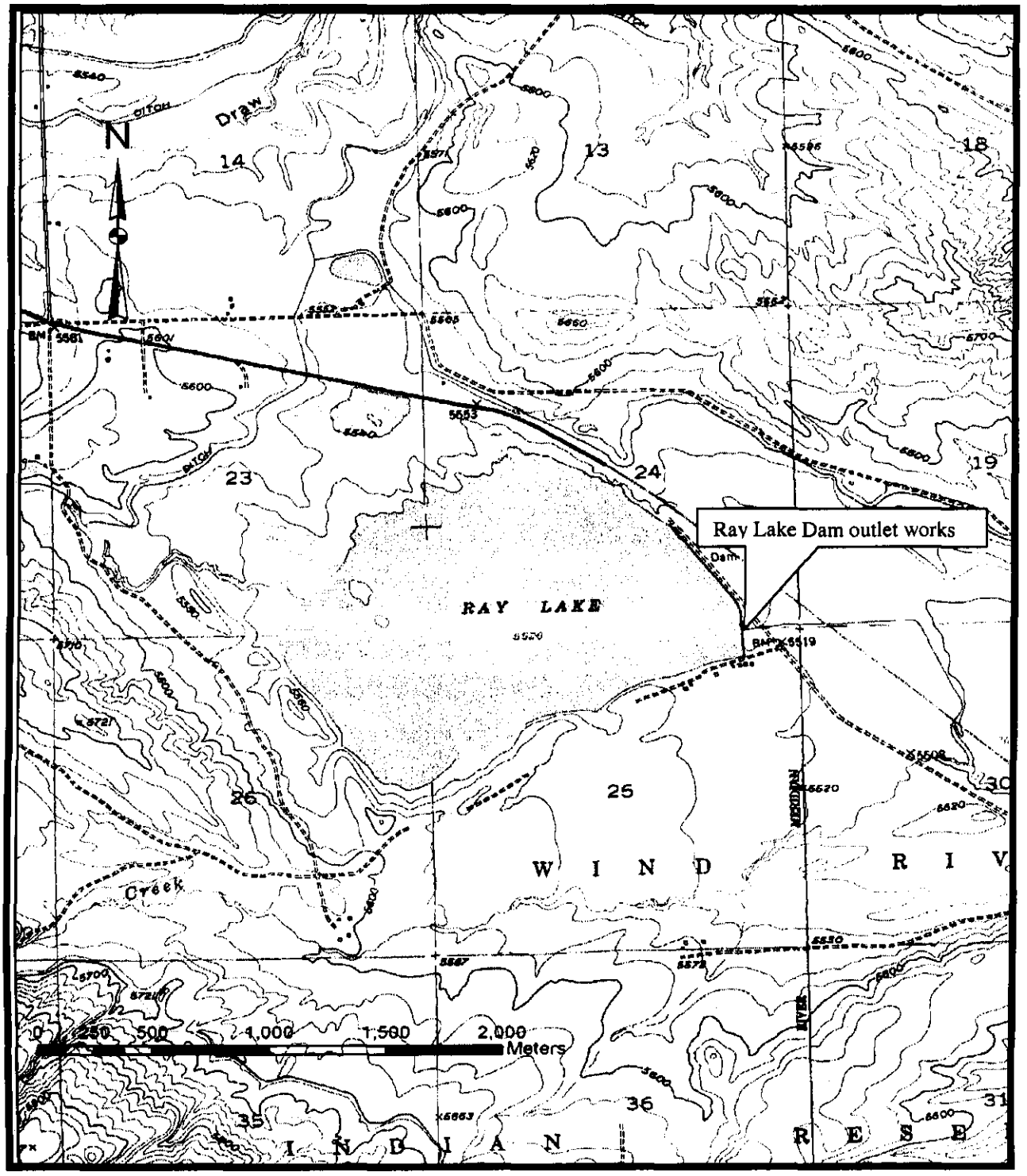

Figure 1. Ray Lake Dam outlet works location.

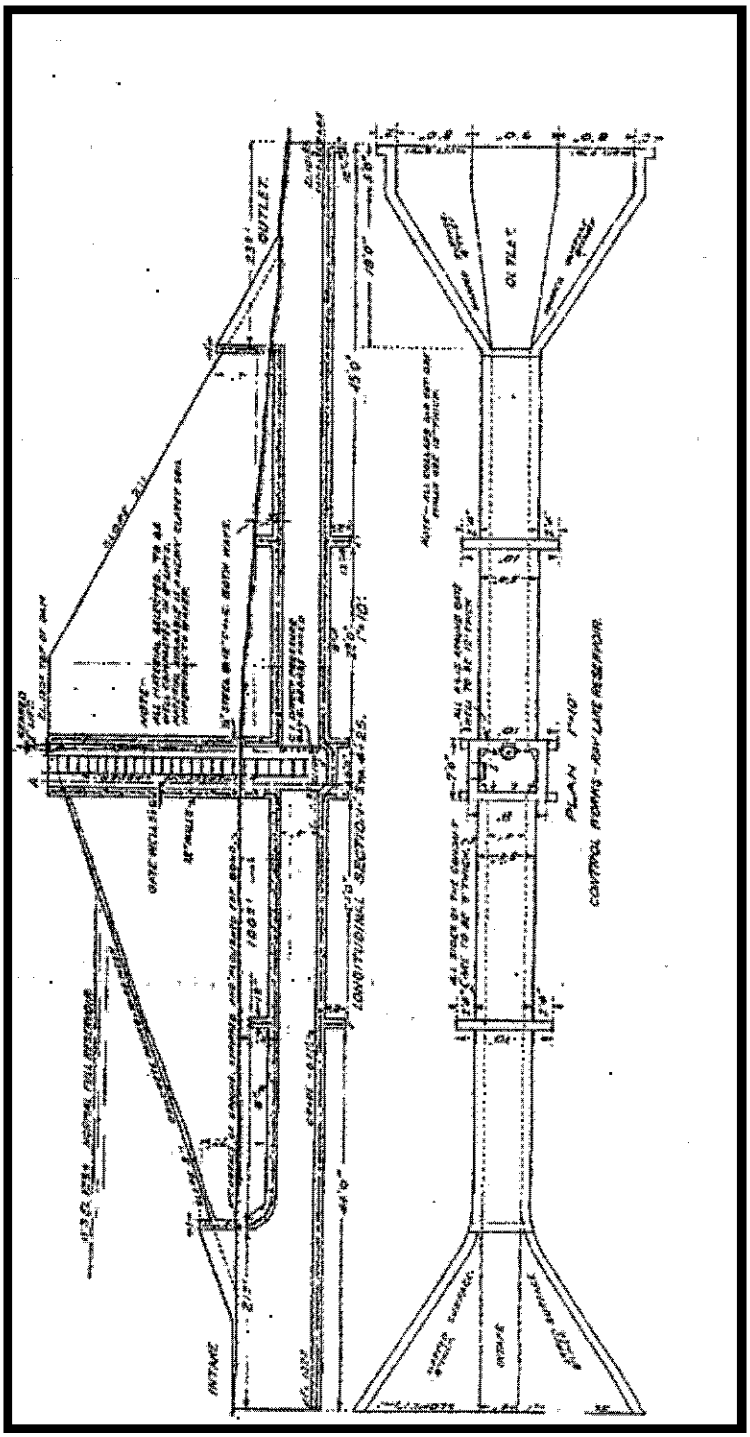

Figure 2. 1920 drawing of Ray Lake Dam Outlet Works

vertical gate stem operated manually by a hand geared lift pedestal crank from the top of the embankment. This gate wheel sits on a raised concrete platform covered with 2″ x 4″ boards.

The stilling basin (also called the outlet, outfall or terminal structure) is a box-shaped reinforced concrete structure constructed instead of the planned trapezoidal apron. The basin dimensions are approximately 21′-0″ wide x 20′-0″ long with the back wall height approximately 12′-0″. Concrete baffle blocks or stoplog piers with slots stand in front of the exit portal with corresponding slots in the outlet side walls.

IV. MODIFICATIONS

Some temporary repairs made to cracking of conduits occurred in 1984.[9] There is no available record of any other modifications. Routine maintenance and repairs have been ongoing.

V. OWNERSHIP AND FUTURE

The U.S. Government has maintained ownership of the Ray Lake Dam Outlet Works within the Little Wind River Unit, Wind River Irrigation Project, since its construction.

The new construction of the Ray Lake Dam Outlet Works is required under the Bureau of Indian Affairs Safety of Dams Program. Seepage problems and cracks in concrete necessitate the complete replacement of the outlet works. The Ray Lake Dam Outlet Works will be demolished. The new outlet works will be similar in concept and design to the original.

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[9] Bureau of Reclamation, *Ray Lake Dam Comprehensive Dam Review,* 15.

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